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as of all other pleasures, and all pain also, is explained on the theory of selection.

It is desire alone which leads to action. Among the lower animals it is the momentary impulse which always determines action. Hence these, if destitute of these passions in the gratification of which they preserve their existence and continue their kind, would speedily perish.

In man both these desires are strong and constitute the motive, either direct, or indirect, to the greater part of his acts.

There are of course other desires, many of which may be regarded as derived from these, but some of which are apparently also original and natural, but whatever they may be they are in the nature of forces, and all the desires taken together may be appropriately called the *Social Forces*. These social forces readily fall into two groups and each of these is capable of subdivision into subordinate groups, as the following table will show :

Essential Forces.	Preservative Forces.	Positive, gustatory (pleasurable)
		Negative, protective (painful.)
Non-essential Forces.	Reproductive Forces.	Direct (The sexual instinct.
		Indirect { Parental and consanguineal affections.
		Esthetic.
		Emotional.
		Intellectual.

Space forbids the elaboration of this table, and indeed it scarcely requires it. I will only say a word on the last group named in it, the intellectual forces. Upon this point much confusion, and as I think, error prevails. It is at the present time at least, a very small and unimportant group. Properly it embraces nothing beyond the mere yearnings of the intellect. Its only basis is the pleasure of intellectual action.

I strenuously object to throwing the whole effect of mind in social development into the class of social forces. The social forces are indeed psychic, but they are not intellectual. The intellect is in no true scientific sense a force. It is not a motor influence.

It is characteristic of every true natural force that the body impelled or attracted by it moves in a straight line from the impelling or towards the attracting object. If it move in a curve or any but a straight line this is always due to a plurality of forces acting in different directions. This is true of all the social forces. Desire, wholly unaccompanied by reason, always impels in a direct line towards its object. This is illustrated most clearly by the acts of the lower animals.

The fly buzzing against the transparent pane until exhausted without sufficient intelligence to try another locality is an example daily witnessed. Moths seeking a flame regardless of its destructive power, and rising with scorched wings, plunging anew into the fatal charm, show the action of a force scarcely higher than the purely mechanical. It is so with every form of desire. But for the intellectual agency, to however slight a degree, all animal action, human action included, would be of this direct character. The influence of mind sustains the same relation to the true forces of desire that the rudder of a ship, moved by the helmsmen, sustains to the sails acted upon by the wind. As it is not the former that propels the ship so it is not mind that propels society. The great results which are collectively termed civilization are the direct outcome of these impulsive social forces, guided, of course, by intellect or reason. All the efforts that have been put forth have been made solely for the satisfaction of present desires. The end really reached has not been the end sought. Function has been totally ignored and feeling alone consulted. The ends of Nature have been attained, not directly as objects of pursuit, but only indirectly through the means of Nature which are the ends of the feeling creature.

It has been remarked that owing to adaptive influences these naturally independent lines leading respectively to the ends of Nature and the ends of the sentient organism converge to the same point. The effects produced by obeying the desires in most cases are the effects necessary to preserve, perpetuate, and develop the organism. But here is the fundamental distinction to be noted. These functional effects are secondary. It is not to secure them that the acts are performed. The beings performing them

take no thought of them. The only effect in the mind of the agent is the satisfaction of a present desire. It may be safely said that this is almost universally the case even in human action.

But it may be asked what difference it makes, inasmuch as the indirect or functional end is always secured by the previous harmony brought about by adaptation.

With non-progressive beings like the lower animals, it may be admitted that it makes but little difference. Here the chief interest centres on biological questions, questions of anatomy, histology, morphology, etc., and therefore the objective or biological standpoint is usually, though not always, sufficient. But with man, a progressive being, whose actions transform the entire face of the planet and lift him by rapid steps from one plane of activity and life to another, it becomes of the utmost importance that the true nature of his motives be scientifically understood ; that the effects produced be attributed to their true immediate causes and not to indirect or merely incidental ones. Nutrition is not an end of human conduct in seeking food ; it is the satisfaction of hunger. A family is rarely a direct desideratum in human life. Every physician knows how often it is an object of dread. It is only an incident. The great blessings of accumulated wealth have never been the immediate object of industry and financiering skill. These are the direct results of that great derivative passion called avarice which has been so unjustly condemned. Industry, commerce, art, and often invention flow from the "love of money," which has been most superficially called "the root of all evil," when it is really the root of nearly all good in civilization. Labor is performed and heroic deeds achieved not to make the world richer and happier or set examples of nobility for future ages, but to secure the immediate wants of the individuals performing them, to gain money and applause, to win the fair and to support them. Avarice, ambition, love, each has accomplished its direct results in the true civilization of the race.

PROFESSOR EDWARD D. COPE

The bibliography of Professor Edward D. Cope has been ably written by Professor William Hosea Ballou, one of our subscribers :—Professor Ballou states that, "the life of Prof Cope is the index of all that is romantic in science. A sketch of his literature would be void of much of the interest attached without notation of some of the points in his most extraordinary career. At the early age of sixteen he began writing on scientific matters, though he must have attained twenty-four years when his writings first began to attract attention. He is one of the few living writers who has been able to successfully turn at will from any department of living biological forms to those whose remains are found only in fossil state. From studies of this nature he boldly enters the realms of metaphysics, bringing out an astounding number of genuine contributions to knowledge. In the bodies of learned men of which he is a leading figure, he astonishes all who hear him by the facility with which he addresses or converses on topics under discussion. He seems both in his writings and speeches a man prolific in voluminous knowledge of kindred subjects. His investigations have already resulted in his naming upwards of 1,000 species new to science, besides innumerable genera. He has written on every existing family of vertebrates, and revolutionized the classification of the amphibious animals by utilizing the skull as a source of differential characters. The classification of fishes has also been much modified by him.

The best part of his work is undoubtedly comprised in his paleontological (extinct animal) studies which have distinguished him throughout the scientific world. In 1879 the Royal Geological Society of Great Britain awarded him a medal for doing the most work in this line of any individual for the year."

This interesting memoir can be found in the *Chicago Field*, for August 21 and 28, and with the list of Professor Cope's literary papers and contributions, occupies eleven columns of that journal.